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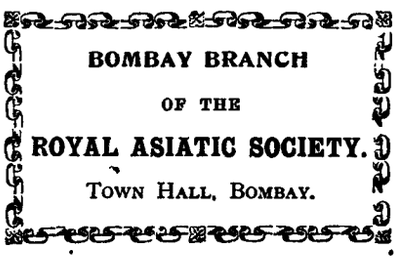

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OPERATIONS

FOR THE

IMPROVEMENT OF THE NAVIGATION

OF THE

GANGES FROM REVELGUNGE TO ALLAHABAD,

DURING THE SEASON 1849-50.

142258.

CALCUTTA:

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1851.

No. 23 of 1850.

From E. A. READE, Esquire,
Commissioner, Fifth Division,

To J. THORNTON, Esquire,
Secretary to Government N. W. P., Agra.

Dated Benares, 15th August, 1850.

Sir,

I have the honor to submit Lieutenant Garforth's Report, dated 1st instant, and Maps regarding the operations conducted by him during the past season, in removing obstructions to, and in improving the navigation of the Ganges, between Revelgunge and Allahabad.

2. Lieutenant Garforth joined me on the 1st December last, and we then concerted the arrangements, which have since been continued, for aid being rendered to him and his establishment, by the Local Officers posted near the river.

3. The Magistrates and Collectors, and their Officers, received due notification of his appointment, and were required to render him all proper assistance. He was authorized to draw upon the station, and, in some instances, the Mofussil Treasuries near the river side; in the latter case taking care to give notice to the Collector of the district at the same time. The Collectors were required to give me immediate advice of each draft, and Lieutenant Garforth to transmit a monthly register of all such drafts. Suitable forms of address to the Collectors and their native subordinates also were furnished him, and copies of all requisitions to the latter I required to be sent to this office as they were issued. The Collectors of Ghazeepoor and Mirzapoor were requested to adjust the drafts on their Treasuries, as remittances to the Benares Treasury. The charges of fixed establishment, sanctioned by Government, it was arranged, should be sent direct to the Civil Auditor. All contingent bills, with the necessary vouchers, to be transmitted to this office for countersignature, if approved, with a monthly account current.

4. These arrangements have continued to be observed, and there has been no confusion, delay, or misunderstanding.

5. I considered it necessary that Lieutenant Garforth should be formally invested with the powers of Supervisor described in Sections 8 to 15, Regulation VIII. 1824, which measure was sanctioned by Government Orders, No. 138, dated 21st February last.

6. Having made his arrangements, regarding establishment which has been for the most part formed from the class of men who assisted Mr. Lloyd in his experimental operations in the two previous years, the Supervisor took charge of the Pilots, who have since continued under his control.

7. His attention was next given to certain sunken trees which I have in previous reports represented as serious dangers, and the removal of which, ordinary means having been but only very partially successful, I recommended by the means of gunpowder. Lieutenant Garforth felt assured that by means of capstans on the bank, and the superadded aid of a Steamer he would be able to remove these obstructions at comparatively small cost. In paras. 26 and 27 of his Report, he states the failure of these experiments, and the complete success which has attended the subsequent attempts made with the use of gunpowder and a galvanic battery. These operations, for the efficiency of which we are much indebted to Dr. Ballantyne and Mr. Tresham of the Benares College, were reported to Government in my letter, dated 12th April last, and have been honored with commendatory notice. It has been justly remarked that Mr. Tresham's merit consists in not only having succeeded with such means as are procurable in the bazars, but in having taught others to apply those means. I may add that I consider credit due to Lieutenant Garforth in having availed himself of the means, and liberally encouraged others to aid him in the improvement to which his talents have been applied.

Vide Appendix C.

8. His next most notable operation was in the Bullea Reach, and which also was subject of a Report from him and myself severally, dated 31st May and 3rd June last. In Appendix D of his present Report he has made a recapitulation, by means of fascine spurs with some variety of success and failure in the course of the experiment. The longest and most troublesome obstruction in the River between Revelgunge and Mirzapoor has been gradually but completely overcome; whether the expedient resorted to will prove of permanent benefit remains to be seen, but at least the best means of dealing with the Bullea waters, the burden of each Annual Report, have been ascertained.

9. Lieutenant Garforth details minor operations with the use of bandels, of which full accounts have been given in previous papers, and in para. 46 of his Report his testimony is added to those of his predecessor, that for ordinary occasions no other substitute answers as well. In the following para. he confirms Mr. Lloyd's condemnation of the catch water finders, or hedge or severn bandels, the use of which, will not, I imagine, be repeated.

10. Although this is the first year of Lieutenant Garforth's experimental operations, and he has been cautious to avoid great expense, and to make himself thoroughly acquainted with his charge before undertaking greater

measures, he has, I think, in his enumeration of the various means and appliances which have been suggested by different parties, sufficiently proved, that simple bandels for ordinary shoals, fascine spurs for long shoals and quicksands, and gunpowder and a galvanic battery for sunken trees, boats and kunkur spits are the three best means for the desired ends.

11. In para. 1 of his Report he rather gives the river some of the credit which I think is due to himself. His Report is so plain and unassuming, that, in common justice, I must state that the general Report of his proceedings has been favorable. It is a sort of indirect testimony that the clamor for removal of sunken trees has subsided, but has been replaced by another cry for the removal of obstructions of another but not less dangerous character.

12. To this Lieutenant Garforth alludes in para. 33, wherein he proposes to remove, by the same process as that which was employed on the rocks in the Jumna, a kunker bed near the mouth of the Goomtie. On this subject I would refer to former Reports, but more especially to para. 36, dated 10th October 1848: Lieutenant Garforth, the Government may be assured, will not interfere with kunker formations connected with the *margin* of the river, but the removal of such obstructions in *midchannel* is as much a necessity and duty, as that of removing sunken trees. His proposition to have a suitable boat for the battery will, I trust, be approved.

13. The expense of Lieutenant Garforth's operations during the past season, exclusive of the charge for Pilots, which latter is of course an expense incidental to the employment of steamers, has been 9,381 Rupees, a sum very considerably less than the estimate which was forwarded with my last Report, even after excluding the same charge for Pilots, and the larger salary of the Supervisor. It is less by nearly 5,000 Rupees. In fact the numerical strength of Lieutenant Garforth's establishment might have been doubled without exceeding that estimate.

14. With reference to the contingent charges, I beg leave to certify that they have been submitted in full detail in every case to this office, with all necessary vouchers, and have been passed after examination.

15. Upon a review of the proceedings during the past season, I think a decided advance has been made. Lieutenant Garforth's proceedings have been conducted with judgment and caution. He has attained the good-will of those who ply on the river, and live on the banks. Authority was requisite on the river, as well as its margin, and he has maintained his without any collision with the others. I look with confidence to further progress of improvement in the ensuing season.

Commissioner's Office,
5th or Benares Division,
The 15th August, 1850.

EDW. A. READE,
Commissioner, Fifth Division.

No. 1.

THE SUPERVISOR GANGES WORKS

TO THE SECRETARY TO GOVERNMENT, N. W. P.

CHUNAR, 1ST AUGUST, 1850.

State of the River.

Those who have watched the Ganges in former seasons say that the difficulties have been few during the last dry weather, the channels more direct than usual, deeper, and less liable to sudden change; the general depth, when lowest, measured on kunker beds, was about 1 foot more than 1848-49.

Revelgunge.

2. In December one-half the river ran in its old bed past the town of Revelgunge; the other half down the Sinha Nulla; (Sketch No. 1,) the latter was increasing, but had not breadth in its course, nor depth at the lower entrance for steamers. Six of these boats were collected at one time at the bend above the town, waiting their turn to pass the shallow. Early in January the Sinha Nulla was open for all steamers; a shoal formed shortly afterwards, dividing the lower mouth into two channels; the left one was closing and one steamer was delayed in it; while the right channel gradually opened: it has continued open from that time.

Dabaoli.

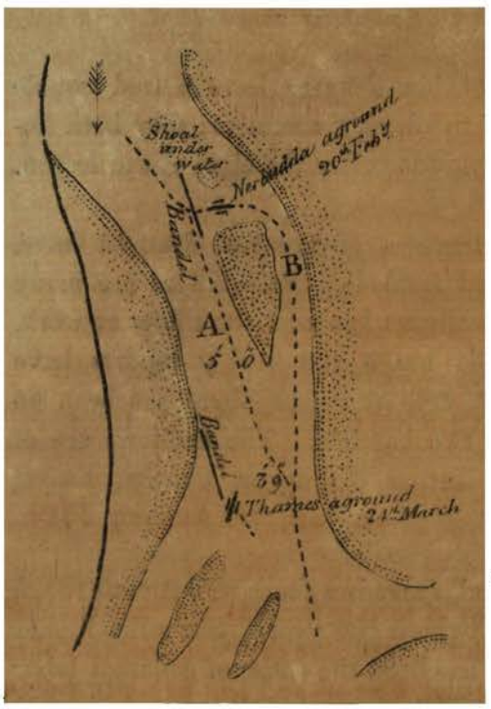
3. At Dabaoli the channel, when I first saw it, threaded among sunken trees. It afterwards changed towards the sandbank on the left. About April few of the larger steamers could cross it unless lightened. This shoal continued in May, and until the rise of the river.

Narehi.
Bamnaoli.
Kot.

4. At Narehi was a straight narrow channel 4 feet deep; the steamer *Benares* grounded there 10th December, carried the sand along, and in one night the depth diminished to 3 feet; and subsequently became dry. Another channel formed towards the right, and improved, but the sand washed from Narehi collected lower down at Kot; and in April had filled up so much of the bed, that it was necessary to work there, (Sketch No. 2.)

5. From Narehi the river has been clear past Buxar and the mouth of the Karamnasa to Sherpoor and Raotipoor. Here was a channel six feet deep until the westerly winds of March. The dotted line B shows the track of steamers up to February, and A that subsequently used.

Raotipoor. The Doongurpoor Reach.



6. Proceeding upward, the next difficulty was at Gosaindaspoor, about 2 miles below Ghazeepoor. Here the river spread into several channels; but the reverse of Raotipoor. The westerly winds opened a straight channel 6 feet deep towards the right bank. This place gave no trouble after March.

7. Opposite the Opium Factory there has been a shallow throughout the dry weather with just sufficient water for all steamers to passover it. At Saraia below the sharp bend of Zalmania, a shoal 4′ 6″ deep: steamers have not been delayed there nor between Zalmania and Deochandpoor.

Ghazepoor.

8. The first difficulty was caused by the water dividing into three parts opposite Chakeri village. In February the centre channel was closing while that to the right increased. This was assisted by bandels; and the right hand channel, though shallow at its upper mouth throughout the season, has not caused serious delay. The next place where shallows appeared was Nidhiura, 2 miles above Chakeri; here also bandels kept the navigation open, but did not give so good a channel as might have been wished. Opposite to Deochandpoor, where the whole bed of the river is supposed to be kunker, overlaid in most places by sand, the channel changed in April towards the right, and ran through a strait having kunker on one hand and a shallow on the other. Few steamers could steer clear of both these dangers, and generally in avoiding the sandbank ran upon the kunker; it was carefully marked, and the Pilots knew the ground; they were not in fault.

Deochandpoor.

9. Upward from Deochandpoor, at the mouth of the Goomtie River, there had been in the season 1848-49 danger and injury from the kunker. I therefore entertained a special extra Pilot for this intricate channel alone; his duties confined to the 2 miles from Saidpoor to the Goomtie; he did not interfere with the regular Pilot Establishment; there was no accident here.

Kunker bed mouth of the Goomtie.

Miserpoora. 10. A little above Baloa Factory a shoal has existed throughout the year, but it has not caused detention.

Kaili and Sahjao. 11. Kaili and Sahjao, about 8 miles below Benares, have caused trouble and detention to some of the deeper steamers: they both improved without artificial means before the close of the season.

Benares to Mirzapoor. 12. Benares to Mirzapoor. The steamers of greatest draught have, once or twice, returned from Benares. There are many shoals: but a smart overseer has kept the Pilots at work, marking and watching the channels; and though the weekly reports have often shown depths less than four feet at various places, there has been no delay of more than a few hours, and but two bandels. The shallows are at Radaoli below Sultanpoor, Bhawulpoor, Katnai, Nanupoor, Chatha, Etaya, Naoria Ghaut and Chaxali.

Bindachal. Tilei or Deyrwa. 13. Above Mirzapoor near Bindachal, there is a shallow, but with depth enough for all boats throughout the year. Six miles higher at Tilei is a shoal which has been the cause of constant labor from December until the end of June. The channel first turned sharply near the tail of the sand opposite Tilei village, (Sketch No. 3); and came under the right high bank. This bank composed of soft clay, fell in and filled up the bed, then a way opened near the middle, and finally came close under the left sandbank with a turn so sudden, that no steamer could be steered round it. The boats were warped through by anchors after a delay of hours, and, in some instances, days; bandels were applied in various ways and kept the channel open for a couple of days after they were put down; but the constant changes baffled a painstaking overseer. The place improved only on the general rise of the river.

14. From Tilei quite up to Sirsa there has been no obstruction this year.

Sirsa. 15. Close below the town, near the kunker beds on the right bank a shoal formed in May; boats drawing 3′ 8″ could cross it.

Above the Tonse. 16. Above the mouth of the Tonse the channels have been changing throughout the season. In January there was a bar across the river 2½ feet deep; one of the light Government flats failed to cross it: this afterwards became deeper, and a difficulty appeared at the sudden bend above Dumduma village. Here were three channels, all of hard sand, all shallow 2½ to 2¼ feet, and constantly blocked by passing native boats.

Above Dumduma to Diha. 17. From a point about 1 mile above Dumduma, the river winds in its sandy bed towards the left bank; from hence it has a tortuous course of about 4 miles to Diha, where the right bank is

high and the river confined. In these 4 miles the river presents a succession of shallows interspersed with islands; the length of this difficulty is so great that on first inspecting it in January last, I determined to make no attempts above Sirsa to deepen the water by artificial means.

Lewain.

18. The next shallow is at Lewain, under the right high bank, which has fallen in near the old fort and thrown the deepest channel into midstream; this has varied from 3 to 3½ feet, but for the reason abovementioned, nothing has been done to it.

Chatnagh. Jhoosi.

19. The river then crosses to the left high bank, and at Chatnagh there have been shallows continually, and again in crossing to get into the Jumna, there have been generally difficult places near Jhoosi.

Allahabad.

20. Notwithstanding these difficult shoals above Sirsa, several of the Government boats have reached Allahabad, and the large steamer *Ghazeepoor* arrived there in March; most of the large boats have returned from Sirsa, some from Mirzapoor, and one or two from Benares.

Means used to facilitate navigation, 1 Pilot.

21. I received charge of the Government Pilots between Revelgunge and Allahabad from Mr. White of the steamer *Bentinck* on the 31st January. Before giving over charge, Mr. White had, by order of the Comptroller Government Steam Vessels, increased the number of beats from 11 to 15.

22. Before I had charge and payment, the Pilots had avoided me; now they accompany me through their beats, and when I am in their neighbourhood make great display of zeal and activity; still they cannot be prevented from too frequently visiting their homes; and several steamers' commanders have complained of their absence when wanted. On these occasions, and on grounding a vessel without good cause, they are fined. A proposed system of certificates forwarded by commanders at the end of each voyage, if approved by the Comptroller, will, it is hoped, by bringing acts of negligence quickly to my notice, enable me to apply a remedy. Those overseers, who have conciliated the Pilots, have had the least occasion for bandels, the smallest contingent bills, and comparatively little detention to steamers in their beats.

Second operations against sandbank, 1 bandel.

23. Two methods have been tried for removing sandbanks; first bandels of bamboo posts and mats; second spurs of fascines.*

24. The bandels have been placed in the river at 1, Raotipoor; 2, near Ghazeepoor city; 3, Deochandpoor; 4, Chatha above Chunar; 5, Naoriaghat

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* See Appendix D.

below Mirzapoor; 6, Tilei. All these bandels were, generally, constructed by people who had worked under Mr. Lloyd; who used the method taught and described by that gentleman. His recommendation of having, here and there, a post larger than the rest, driven by a machine, has not yet been adopted.

Third operations against mud banks.

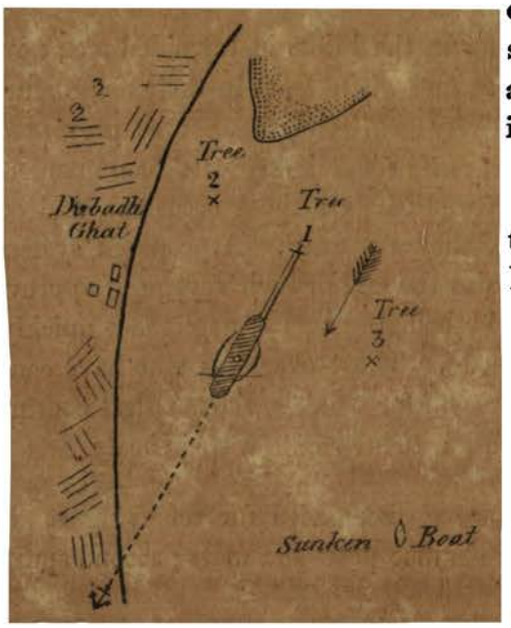
25. No mud banks formed in the channels used during this season. The only two places where I have found a mud bottom near the shoals are at Kot, below the upper mouth of the side channel in the main stream near the left bank: again at the upper end of Sirsa, the bottom is hard mud, mixed with kunker. There have been no operations for removing mud.

Fourth operations against trees.

26. Three plans were tried for removing trees.

First, a steamer tied to the tree; second, a windlass on shore; third, charges of powder exploded under it by the galvanic battery; the last of these only succeeded.

First by steamer. By permission of Mr. Reade, Commissioner at Benares, I made a requisition for the use of the Government steamer *Indus*, Mr. Hamilton, commander. The tree experimented on was a pakur, about 12 feet in girth, having 11 feet water over it, the branches reaching the surface. After the divers had passed a 12-inch hawser twice round the tree, as low down as the sand allowed, the steamer's stern was fastened to it, all steam used, and a kedge anchor carried to the shore in front.



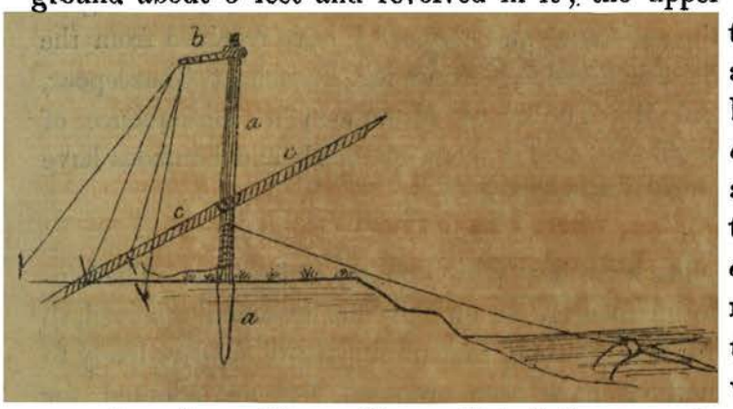
The force applied at the tree was computed by Mr. Hamilton to be—

	horses.
Two Engines, 30 horses each,	60
Kedge anchor, ...	10
Stream and favorable wind,	5
Total power applied	75 hs.

There was no effect on the tree.

Second by windlass on the shore. Two windlasses were fitted up on the shore, about 80 feet from the nearest tree, an upright post *a* was let into the

ground about 5 feet and revolved in it; the upper end of the post passed



through and turned in a cap *b*, fixed in its place by gug ropes; thus post *a* revolved freely on its axis; the rope from the tree was brought round *a*, and wound upon it by means of a long beam *c*, tied across *a* at a convenient distance for men to push. About fifty coolies applied their strength, and continued winding until the rope broke more than once, was repaired; and at length the fibres of the wood of upright *a* were so twisted, that there was fear of its breaking off to the injury of the men passing round. The tree remained firm.

Third by powder exploded by the galvanic battery.*

27. Boats are frequently upset by wind, or blown upon a sandbank. When a leak opens, they sink, and work into the sand. The overseers have, in most instances, induced the natives to extract them, and have given assistance in men and boats. The boats laden with firewood, and those with stone from Chunar are often laden to the water's edge. The overseer, in whose beat this occurs, has in vain endeavored to induce the manjis to take a smaller load; boats leave Chunar almost daily, so deep that a squall must upset them.

Ramoval of sunken boats.

28. There are several partly buried in sand, which have got no further on their voyage than Sultanpoor.

29. Where the bank is soft, and trees have been seen dangerously situated, in two or three instances, the zemindars have been persuaded to remove them, generally in the Ghazeepoor district. In the other districts, westward, the banks are harder. Here certain trees have been marked for removal when it may be necessary. In part of the Shahabad district the bank for 80 paces from the river has been cleared of trees and bushes. This, I believe, is on the land belonging to the Raja of Doomraon.

Preventive measures, Trees.

30. Mats and bamboos have been collected, by order of Major Lang, Superintendent, Nuddea Rivers, at the mouth of the Bhagirutty; and the Comptroller Government Steam Vessels has ordered that the boats should bring them up. I received them in March and April. These materials have also been procured in the Shahabad district, in the district of Ghazeepoor; and at Ghazeepoor, furnished by Mr. Bachman, Deputy Collector

Materials.

* See Appendix C.

at Mirzapoor, from Messrs. Hamilton, Higginson and Co. I here beg to express my gratitude for the assistance and support I have received from the Collectors of districts in the 5th division. From Mr. French at Ghazeepoor, Mr. Shank at Benares, and Mr. Tucker at Mirzapoor, in consequence of whose orders to the Native officials under them, materials and bamboos have been readily procured and every want supplied.

Proposed operations—1, Sand.

31. Temporary remedies seem best for temporary difficulties. The bandels are so inexpensive, so quickly put down and removed, so effective for a short time, that no substitute appears likely to answer so well. Three methods have been proposed, but not adopted, for removing sand. 1, Catchwater fenders, as described by Lieut. Colonel A. H. E. Boileau. These were, in fact, tried, that is, a row of fascines was allowed to float, secured by bamboo pins on each side. They diverted the ripple on the surface of the stream, but had no other effect. 2, Chains dragged after a steamer, proposed by Captain Rogers, I. N., Superintendent of Marine, and previously brought to my notice by Mr. Wyatt, Deputy Collector of Benares, as having succeeded in clearing out docks in England. This appears a question of expense. Is not the plan now in use of raking and treading up the sand, more effective and less costly than the employ of steamers would be? For were each of these boats on the downward voyage, on arrival at every shoal, to let out chains, drag them along, and take them in when again arrived at deep water, the delay and consequent increased consumption of coals would be great. 3, Punts moored in echelon,* proposed by Captain Kittoe. No better bandel could be desired than one of the long steamers of the Ganges Company, but they generally ground in the wrong place, and do harm. The punts properly applied, would doubtless be very effective; 6 or 8 fleets would be needed to keep 300 miles of river open; such boats are not quickly moved, especially upward. This appears also a question of expense.

Two Trees.

32. There is another plan for removing trees which may be found less costly than blasting; a crosscut saw fixed in a frame. Mr. Hartley, the Dockyard Engineer, and in charge of the *Mersey* at Liverpool, states, that he has cut off the heads of piles 17 feet under water in this way.

Three—kunker.

33. The kunker near the mouth of the river Goomtie is the first which claims attention. It is proposed to use for its removal the means adopted some years since for removing rocks from the bed of the river Jumna; and with the assistance of the galvanic battery.

34. Annexed is an abstract of expenses incurred during the season, and an appendix showing approximately the volume of the river.

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* A nearly similar plan was proposed by Mr. Williamson, commander of the steamer *Ghazeepoor*.

APPENDIX A.

RIVER GANGES CLEARANCE.

Abstract of Expenses, Season 1849-50.

Supervisor's Staff Allowance from 26th November 1849 to 31st July 1850, at Rupees 400 per month, ...	3,266	10	8			
Expenses of personal Establishment, consisting of 1 Writer at 30, Accountant at 10, 4 Khalasis at 4 each, ...	348	0	11			
Expense of removing Shoals, including pay of 3 Overseers and their Boats and Crews, ...	4,318	4	4			
Expense of removing Trees and Boats, including pay of 1 Overseer, Boat and Crew, ...	1,448	9	1			
				9,381	9	0
Separate.						
Pay of Pilot Establishment, between Revelgunge and Allahabad, 15 Stations, at Rupees 31 per Station, from 1st February to 31st July 1850, less fines Rupees 8-8, ...	2,781	8	0			
				2,781	8	0
Total, Company's Rupees Twelve Thousand, One Hundred and Sixty-three, One Anna, ...				12,163	1	0

APPENDIX B.

SECTION OF THE RIVER GANGES.

This section was taken during the first week in May, when the river was lowest at Kot below its junction with the Karamnasa, above that with the little Sarju. Bamboos were fixed across the river in a straight line from bank to bank, nearly at 50 feet from each other. Each space, between two bamboos and between the end bamboos and the shore, is called, for convenience, a house. Each house was considered separately; the depth in it measured at the two ends, and at one or more intermediate points; the surface velocity was also ascertained at the places where the depth was found, a mean taken, and considered the mean velocity of the house; thus the quantity of water, passing through each house per second, was ascertained, and thence the volume of the Ganges. The rule for reducing surface to mean velocity is taken from Mr. Lloyd's last Report. He quotes Du Buat. The side channel F. G. is left out, as it was stopped by a spur at the time of taking the section, and but little water passed through it. The velocity was found by placing a dinghy, on which 30 feet had been measured, in the direction of the stream, a common quart bottle, filled, so as just to float, was placed in the water opposite to one mark of the dinghy, and the seconds counted by a watch until it reached the other mark; at least ten trials were made at each place, and the mean taken: the method is rude, but no better instruments were at hand; and an approximation, now submitted, was obtained to the discharge of the Ganges when lowest.

It will be seen that the greatest surface velocity, that of house 12, near mid channel, is little more than 2¼ miles per hour; even this greatly exceeds the greatest velocity at places where the river is deep, such as Buxar, the Benares Reach, Mirzapoor, &c.

APPENDIX C.

THE SUPERVISOR GANGES WORKS,
TO THE COMMISSIONER, FIFTH DIVISION.

DABAOLI, NEAR BUXAR, 6TH APRIL, 1850.

Enclosed I have the honor to forward a Synopsis, showing the attempts made here to remove trees and boats by blasting with the galvanic battery, the successes and the failures with their causes as far as could be ascertained.

Mr. D. Tresham, of the Benares College, conducted the work until his departure on the 3rd instant, and Dr. J. R. Ballantyne was present and suggested several improvements. The greatest in practice was the introduction into the centre of the charge of a water-tight exploding cartridge, so that if the powder in the canisters might become damp at the sides and at both ends ignition would ensue, and the effect only would be lost of the powder which had been wetted. Since this precaution has been taken we have had no failures.

Owing to Mr. Tresham's good natured patience, the Overseer and Natives have become expert, as was proved to-day when I was merely present as a spectator, and Natives went through the whole process. I can now, therefore, safely entrust to this Overseer the clearance of trees, &c., *in any part of the river.*

Experiments with the galvanic battery River Ganges. Removal of sunken trees and boats at Dabaoli near Buxar.

Date 1850 March.	Nature of Battery.	Wire.	Charge.	Depth in feet.	Obstacles.	Effect and Remarks.
	Cells Cell	*Feet*	lb			
25th	6 of 12 butt,.....	70	4	11	Peepul tree No. 1, 18 feet girth, ..	Small bits of wood broken off. Surface of water agitated.
26th	12 cell butt and Mr. Tresham's	120	12	5	Boat 1,500 mun, bottom upward,	The centre of boat shattered. Column of water supposed 40 ft. high.
„	6 cell B. united,		12	5	Peepul tree No. 3, about 10 ft. girth,	Failed. The conducting wires touched each other near the cylinder.
27th	12 cell B.,.....	120	12	5	Peepul tree No. 3,	Large branches broken. Column of water 30 feet high.
„	.....	...	25	5	Same tree,*	Shattered tree, and completely removed it as an obstruction. Column 60 feet.
„	.....	...	12	11	Peepul tree, ...	Failed. Same powder which failed 26 lb.; on examination found powder wet.
„	.....	...	12	11	Same tree, ...	Broke small branches: no water thrown up.
28th	12 cell B.,.....	120	25	11	Same tree, ...	Tree cracked: masses of water raised about 15 feet.
„	.....	...	25	11	Same tree, ...	Upright branch broken: leaving 6 feet water over highest projecting branch.
29th	12 cell B.,.....	120	45	11	Same tree, ...	Failed: water reached powder though priming wire.†
„	.....	...	45	11	Same tree, ...	Failed: connexion in wire broken at 45 feet from battery.
30th	12 cell B.,.....	120	6	8	Peepul tree No. 2, about 12 ft. girth,	Ground loosened: column of water about 10 feet high.
„	.....	....	6	8	Same tree, ...	Piece detached, measuring 4½ feet girth, 7 feet long.
„	.....	...	12	8	Same tree, ...	Piece detached, measuring 3½ feet girth, 8 feet long.
„	.....	....	6	8	Same tree,*	2 Pieces detached, 6 feet girth by 5 feet long and 5½ girth × 6 long.
„	.....	...	45	11	Peepul tree No. 1,	Failed: tin cylinder defective at side: powder wet.†
„	.....	...	6	11	Same tree, ...	Small pieces of wood and bark detached.
April 1st	12 cell B.,.....	120	45	11	Same tree, ...	Cracked the tree and moved the pieces: threw up a mass of water 20 feet.
„	.....	...	45	11	Same tree,*	2 Pieces 7½ girth × 8 feet long and 5 girth × to long removed. Tree completely broken.

* These three explosions completed the destruction of the trees.
† With Ballantyne's water-proof cartridge these would probably have exploded.

APPENDIX D.

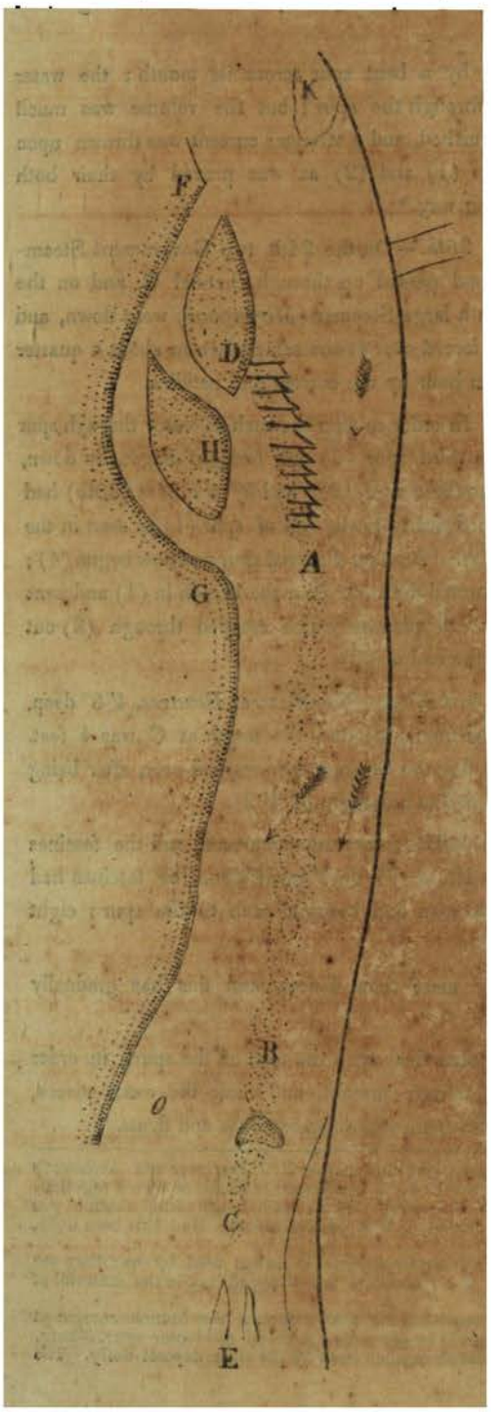
THE SUPERVISOR GANGES WORKS,

TO THE COMMISSIONER, FIFTH DIVISION.

BENARES, 31ST MAY, 1850.

My attention having been directed to the means attempted to remove sandbanks from the River Daunbe, as described in the Civil Engineer and Architect's Journal, Vol. XII., Part 146, I selected the worst part of the Bulliah flats for an experiment, and have now the honor to submit the result.

At Kot, about 6 miles above Bulliah, the channel of the Ganges is at present as shewn in the accompanying Sketch (No. 2 ;) a shoal runs diagonally down the river from D. to E. at a very acute angle with its course. Early in April the depth of water on the shoal was near D. about 6 inches, increasing to 3′ 6″ at A ; from A. to B. 2½ feet to 3 feet, at B. 3′ 3″ then dry, and about 3 feet at C. The channels between the islands at E. were very shallow with little current. There was a strong stream down the left bank which is high, and falling in ; and deep water quite down to C.: the water was deep also up the right bank to H., many native boats of deep draught were daily warped over both at A. and B., and several were delayed three or four days to take out and replace their cargo. The side channel F. G. took away some part of the water which ought to have crossed the shoal, and there was a dry bank above at K. which tended to throw the water into this channel.

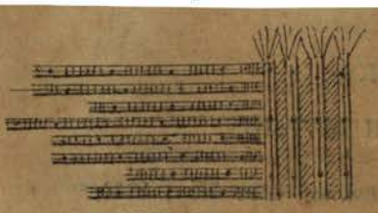


It was proposed to begin at D. and run out parallel spurs as far down as the depth of water close to the right bank would permit ; and when the depth near the shore became too great, to continue the spurs along the shoal in the middle of the river, they would prevent the water from crossing between D. and A.; this done, the side channel F. G. would be stopped and the whole river must pass between A. and E.

12*th April.*—Materials were collected for the fascines, jhao was found in small quantities, cut and brought to the river's bank, and conveyed to Kot on boats. The dal or araha crop had just been gathered ; the stalks were abundant in every village ; they were bought and carried to the fascine depôt at G.

15*th April.*—The fascines were made of araha with a few branches of green jhao in each, 12 sets, of four men each, worked hard from dawn until dusk, stimulated by piece work ; by evening of 2nd May, when fascine-making stopped, 5,399 fascines had been made at a cost, exclusive of string, material and carriage, of Rupees 97-11-2.

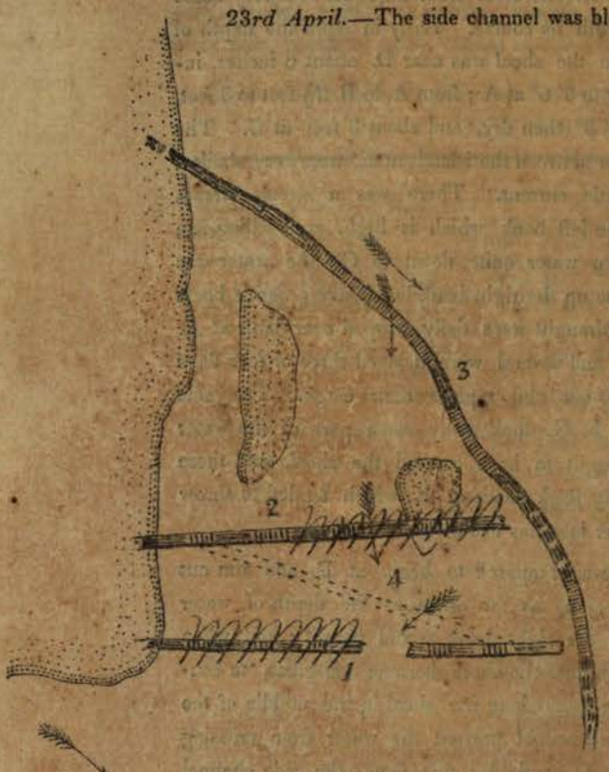
18*th April.*—When a few hundred fascines had been made, a spur was begun just above the lower mouth of the small side channel at D. The fascines were laid in the water in parallel rows 8 abreast, their ends overlapped, and each secured by three pins of bamboo pointed: then another row across them, the third longitudinal and so on, three, four or five rows, according to the depth of water; about 40 yards in length of spur was completed.



19*th April.*—Another spur was begun parallel to the first, and 40 paces above it: 36 men worked at each. This day the Steamer *Assam* grazed over the shoal at A. The spurs were thus continued until the 24th, when they were (1) 138 yards (2) 117 yards long.

22*nd April.*—A very careful examination of the shoal with all the pilots shewed the depths, A 3′ 9″ B 3′ 7″ C 3′ 10″; the current was strongest at C. It had not been expected that effect would be produced by the spurs so far as 1,400 yards below them, but already they had thrown the greatest body of water into this lower crossing place.

23*rd April.*—The side channel was blocked at F, by a bent spur across its mouth: the water ran through the spur; but the volume was much diminished, and a stronger current was thrown upon spurs (1) and (2) as was proved by their both giving way.*



25*th.*—On the 24th two Government Steamers had passed up through channel C, and on the 25th a large Steamer (*Mirzapoor*) went down, and was forced over at the same place in about a quarter of an hour by the current and paddles.

In order to stop the rush of water through spur (1) a third spur (3) was brought diagonally down, across the end of (2); and by the 31st (30th) had reached nearly to the end of spur (1) as seen in the Sketch. Another diagonal spur was now begun (4); this turned the water from the breach in (1) and sent the small quantity which escaped through (2) out past the end of (1).

3*rd May.*—The Steamer *Benares*, 4′ 8″ deep, arrived from Calcutta; the depth at C was 4 feet. Next day the Steamer was warped over, after being lightened to a draught of 4′ 2″.

It now appears that parts of spurs (1) and (2) were useless; they were removed, and the fascines applied to strengthen (3) and add to its length. After 12 or 15 days' immersion, the fascines had become black, heavy, and covered with green weed. Two men had brought each to the spur; eight could with difficulty lift it from its place.

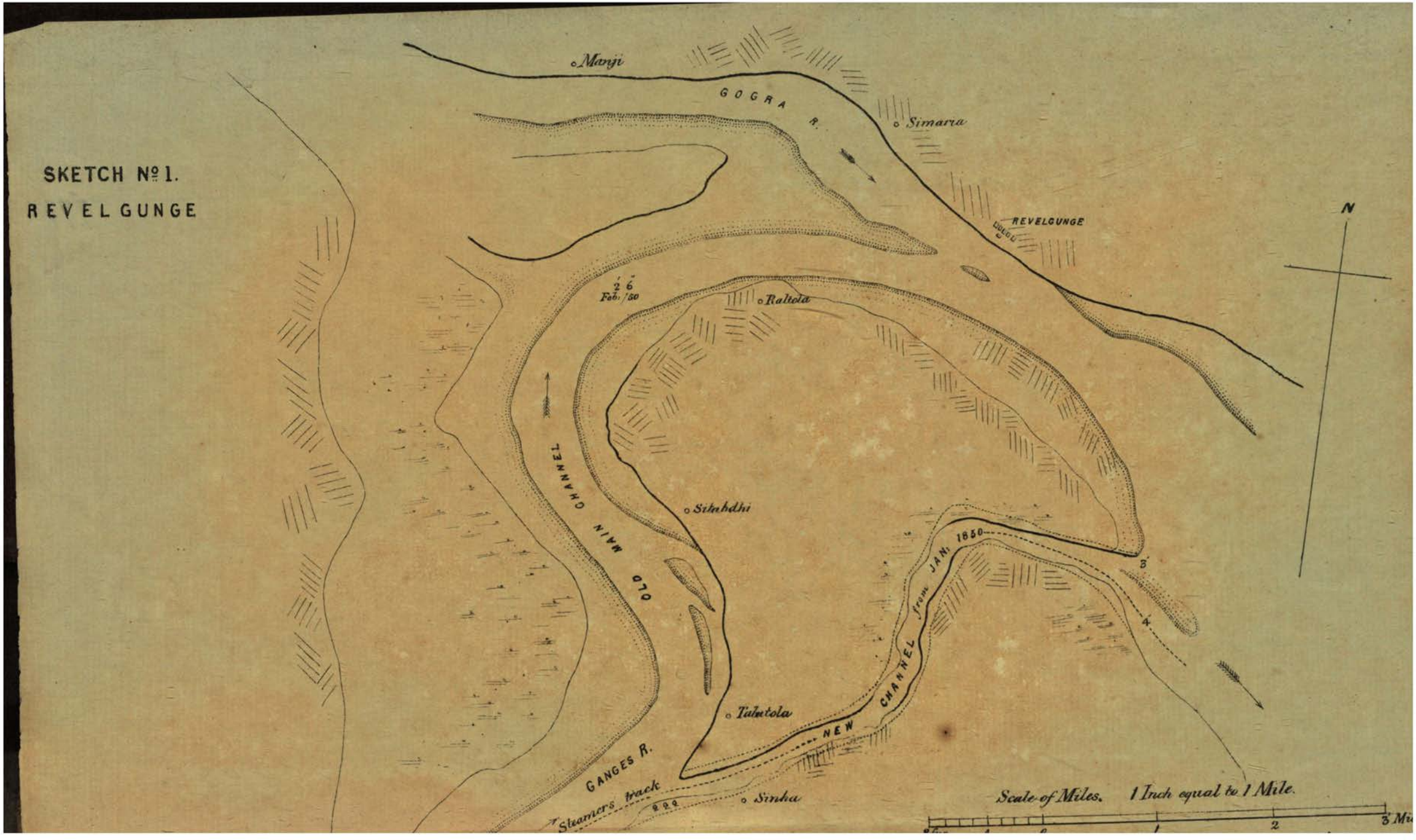
The depth of water over the shoal was now rather more than 4 feet, and this has gradually increased up to the present time.

The heads of the pins have been driven into the fascines flush with the tops of the spurs, in order that boats driving on them may not be injured. The Pilots were present, and know the exact places, and have been ordered on the rise of the river, to mark the spurs with long bamboos and floats.

* Until the spurs had given way I did not understand the paragraph in the Civil Engineer and Architect's Journal. "In the diagrams it will be observed that the series A. and B. of the brushwood is bound or woven together, so as to form one continuous line throughout the entire length of the spur," that is, each longitudinal fascine was woven into the next, end to end, so that each longitudinal row consisted of ropes of fascines. Had this been done, perhaps our spurs would not have been breached.

Remark by Lieut. Colonel Cautley.—"The *long fascine*, the interminable one, is always used by us; they are built of any length, and in some instances are loaded with stone; *i. e.*, boulders are wrapped up in the material of which they are made."

Remarks by Major Rowland Hill.—"At the first glance it appeared to me that stopping the branch current at F was the great thing to commence upon. The spurs 1, 2 and 4, could be of no use. A grand conductor spur, 3 long, strong and semicircular, was the essential wall required, which must strengthen itself by the river deposit daily. The water escaping through the spurs is an advantage."


SKETCH No 1.
REVELGUNGE
Manji
GOGRA R.
Simaria
REVELGUNGE
N
Feb. 1850
Ratiola
OLD MAIN CHANNEL
Sitahdhi
NEW CHANNEL from JAN. 1850
Tulsitola
GANGES R.
Steamers track
Sinha
Scale of Miles. 1 Inch equal to 1 Mile.

SKETCH No3.

TILEI.

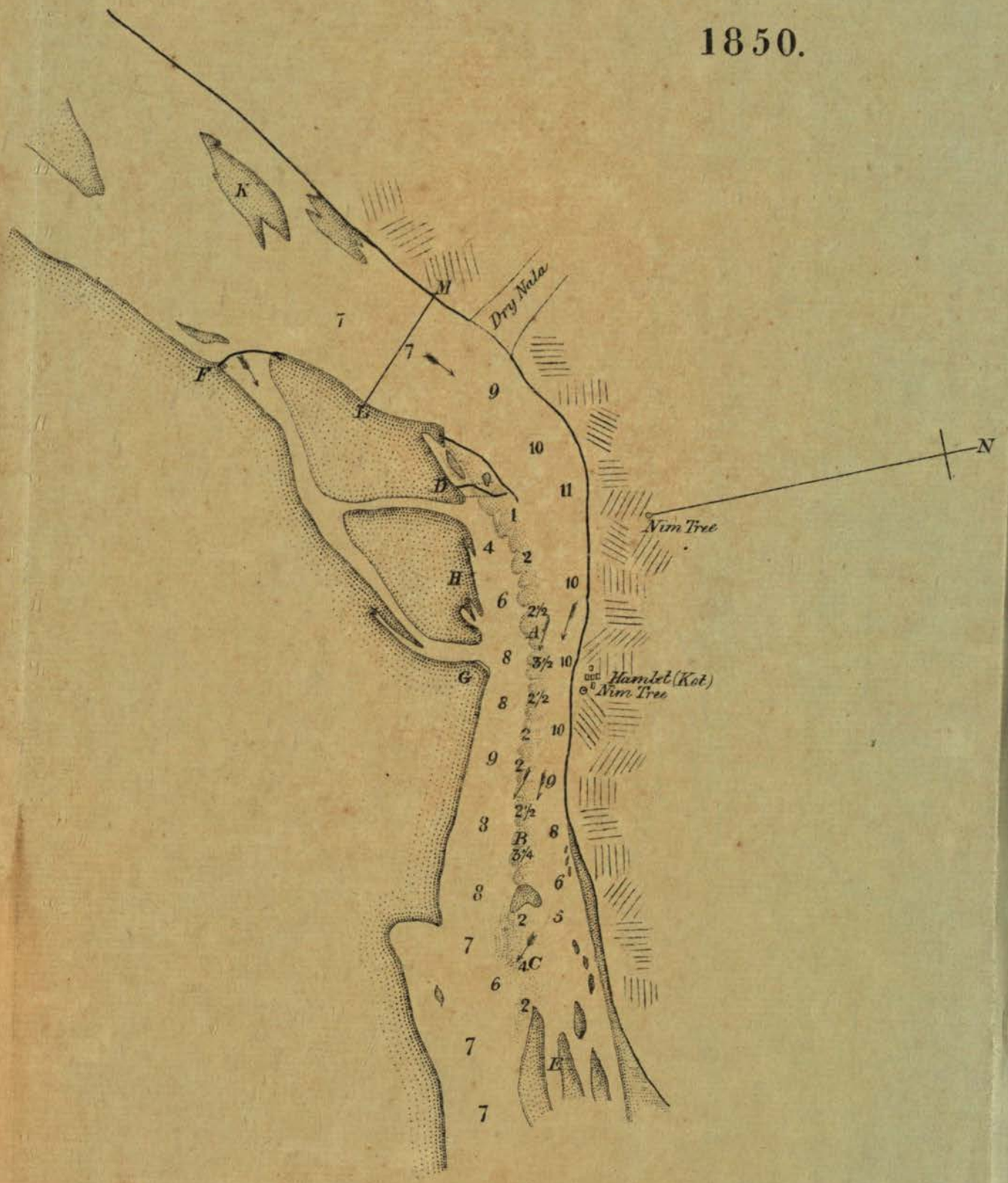
Scale of Yards.- 1 Mile equal to 6 Inches.-

100 50 0 200 400 600 800 1000 Yards

SKETCH № 2.

KOT.

1850.



Scale of Yards 293·3 Yards equal to 1 Inch.

100 50 0 200 400 600 800 1000 Yards

Scale of Furlongs 6 Ins. = 1 Mile.

1 fur. ½ 0 1 2 3 4 5 6 7 Miles

APPENDIX A.

LISTS A. TO L.

A

LIST OF DESIDERATA

OF

Medicinal Plants, extracted from the Flora Medica of Dr. Lindley.

Abuta rufescens.
Acacia gummifera.
Alchornea latifolia.
Aloe socotrina.
Amaracus Dictamnus.
Amyris balsamifera.
Anacyclus Pyrethrum.
Anagyris fœtida.
Andira inermis.
Anthyllis Hermanniæ.
Antirrhoea verticillata.
Arbutus Unedo.
Aristolochia fragrantissima.
„ grandiflora.
„ Serpentaria.
Artemisia Abrotanum.
„ Moxa.
Asarum europæum.
Astragalus gummifer.
„ verus.
Atropa Belladonna.
Aydendron Cujumary.
„ Laurel.

Baptisia tinctoria.
Barosma crenulata.
Benzoin odoriferum.
Boerhaavia decumbens.
Borreria ferruginea.
„ Poaya.
Boswellia thurifera.
Bowdichia virgilioides.
Breweria scoparia.
Bursera acuminata.
Byrsonima crassifolia.

Callitris quadrivalvis.
Calyptranthes aromatica.
Cameraria latifolia.
Capparis pulcherrima.
„ spinosa.
Capsicum annuum.
Casearia Lingua.
„ ulmifolia.
Cassia acutifolia.
Catalpa syringæfolia.
Centaurea Calcitrapa.
Cephaelis Ipecacuanha.
Cerasus Laurocerasus.
Chenopodium baryosmon.
„ Botrys.
Chiococca anguifuga.
„ densiflora.
Cichorium Intybus.
Cinchona Condaminea.
„ lancifolia.
„ micrantha.
„ nitida.
Cissampelos Pareira.
Cistus creticus.
„ ladaniferus.
„ laurifolius.
„ Ledon.
Coccoloba uvifera.
Cocculus Bakis.
„ cinerascens.
„ palmatus.
Cochlospermum insigne.
Colutea arborescens.
Comocladia dentata.
Convolvulus althaeoides.

Convolvulus Scammonia.
Copaifera Jacquinii.
Coptis trifolia.
Coronilla Emerus.
Cosmibuena hexandra.
Coutarea speciosa.
Crataeva gynandra.
„ Tapia.
Crocus odorus.
„ sativus.
Croton balsamiferum.
„ Cascarilla.
„ Eleuteria.
„ pseudo-china.
Curatella Cambaiba.
Cutubea spicata.
Cyclamen hederaefolium.

Datura Tatula.
Daucus gummifer.
Davilla elliptica.
„ rugosa.
Delphinium Staphisagria.
Dicypellium caryophyllatum.
Dieffenbachia seguina.
Dirca palustris.
Dorema ammoniacum.
Dorstenia brasiliensis.
„ Houstoni.

Elaphrium tomentosum.
Epidendrum bifidum.
Eryngium campestre.
Erythroxylon Coca.
Euphorbia canariensis.
„ officinarum.
Evodia febrifuga.
Exostema caribaeum.
„ floribundum.
„ Souzanum.

Ferula Asafœtida.
„ Ferulago.
„ persica.
„ orientalis.
„ tingitana.
Feuillea cordifolia
Feuillea trilobata.
Frazera carolinensis.

Galbanum officinale.
Galipea Cusparia.
„ officinalis.
Geophila reniformis.
Globularia Alypum.
„ vulgaris.
Gomphrena officinalis.
Guazuma ulmifolia.
Gustavia speciosa.
Gyromia virginica.

Habzelia æthiopica.
„ aromatica.
Helicteres Sarcarolha.
Helleborus niger.
„ orientalis.
Helonias officinalis.
Herreria Sarsaparilla.
Heudelotia africana.
Hippomane Mancinella.
Humirium balsamiferum.
„ floribundum.

Icica Aracouchini.
„ heptaphylla.
„ Icicariba.
„ Tacamahaca.
Ilex vomitoria.
Illicium anisatum.
Inga fagifolia.
Ionidium Ipecacuanha.
„ Poaya.
Iris florentina.
Isertia coccinea.

Jatropha glauca.
Juniperus Sabina.

Khaya senegalensis.
Krameria triandra.

Lagetta lintearia.
Lasionema roseum.

Lavandula Spica.
„ vera.
Lisianthus pendulus.
Lobelia inflata.
„ syphilitica.

Magnolia pubescens.
Mammea americana.
Maytenus chilensis.
Melothria pendula.
Mikania Guaco.
„ officinalis.
„ opifera.
Mirabilis dichotoma.
Momordica operculata.
Monodora Myristica.
Moringa aptera.
Myginda uragoga.
Myrospernum peruiferum.
„ toluiferum.

Nectandra cinamomoides.
„ cymbarum.
„ puchury major.
Nicotiana rustica.
Nonatelia officinalis.

Opoponax Chironium.
Oreodaphne opifera.
„ cupularis.
Origanum vulgare.
Ornus europæa.
„ rotundifolia.

Paeonia officinalis.
Palicourea crocea.
„ Marcgraavii.
„ officinalis.
„ speciosa.
Panax quinquefolium.
Passiflora Contrajerva.
Paullinia australis.
Peperomia umbellata.
Petiveria alliacea.
Phytolacca decandra.
Picraena excelsa.
Piper Afzelii.
Piper anisatum.
„ reticulatum.
Piqueria trinervia.
Piscidia Erythrina.
Pistacia Lentiscus.
„ Terebinthus.
„ vera.
Plantago Psyllium.
Plumieria rubra.
Polygala Poaya.
„ Senega.
Porlieria hygrometrica.
Prosopis juliflora.
Protium gileadense.
„ Kataf.
Pterocarpus Draco.
„ erinaceus.
Ptychotis coptica.

Quercus falcata.
„ sessiliflora.

Reaumuria vermiculata.
Remija ferruginea.
Rhamnus infectorius.
Richardsonia scabra.
Rubia tinctorum.

Sabinia fœtida.
Sassafras officinale.
Sauvagesia erecta.
Schinus Molle.
Simaruba versicolor.
Smila Pseudo-china.
„ officinalis.
„ Sarsaparilla.
„ syphilitica.
Soulamea amara.
Southwellia Tragacantha.
Squilla maritima.
Strychnos Ignatia.
„ Pseudo-quina.
„ toxifera.
Styrax Benzoin.
„ officinale.
Symplocarpus fœtidus.

Tephrosia apollinea.
„ toxicaria.
Thapsia villosa.
Ticorea febrifuga.
„ jasminiflora.
Trichilia emetica.
Trichosanthes amara.

Vahea gummifera.
Vanilla claviculata.
Veratrum album.
Veratrum Sabadilla.
„ viride.
Villarsia nymphaeoides.
Vismia guianensis.

Waltheria Douradinha.

Xanthorhiza apiifolia.
Xanthoylon Clava.
Xylopia glabra.
„ longifolia.

B.

List of Plants distributed from the Hon'ble Company's Botanic Garden from 1st January to 31st December 1843. *The average number of species or kinds on the Distribution list may be estimated at* 1,900.

Year.	Month.	Date.	Number of kinds of Plants.	Number of Ornamental Plants.	Number of Useful Plants.	Number of Fruit Trees.	Total number of Plants.	Grand Total.
1843,	*January*	2d	101	118	4	0	122	
	„	4th	38	64	2	0	66	
	„	5th	114	181	60	20	261	
	„	6th	8	8	1	4	13	
	„	9th	56	157	12	0	169	
	„	13th	10	19	0	0	19	
	„	14th	134	339	30	95	464	
	„	16th	50	131	33	5	169	
	„	20th	34	35	0	28	63	
	„	25th	38	60	0	0	60	
	„	26th	18	20	0	4	24	
	„	27th	74	227	10	26	263	
	„	30th	36	72	4	0	76	
	„	31st	36	39	2	0	41	
				1,470	158	182	1,810	1,810
	Feby.	1st	76	151	17	29	197	
	„	2d	11	13	1	0	14	
	„	6th	20	5	31	11	47	
	„	8th	4	3	0	1	4	
	„	9th	63	108	5	0	113	
	„	10th	6	9	2	0	11	
	„	13th	37	58	2	0	60	
	„	14th	39	50	2	0	52	
	„	16th	14	20	1	0	21	
	„	18th	10	8	0	5	13	
	„	20th	24	25	7	3	35	
	„	21st	1	0	150	0	150	
	„	23d	18	2	8	19	29	
	„	25th	2	0	165	0	165	
				452	391	68	911	911
						Carried over,.....		2,721

Year.	Month.	Date.	Number of kinds Plants.	Number of Ornamental Plants.	Number of Useful Plants.	Number of Fruit Trees.	Total Number of Plants.	Grand Total.
				Brought forward,.....				2,721
1843,	*March*	1st	77	131	2	0	133	
	„	3d	12	10	2	0	12	
	„	7th	34	41	1	2	44	
	„	8th	45	50	148	43	241	
	„	18th	13	11	300	1	312	
	„	30th	1	0	2	0	2	
				243	455	46	744	744
„	*April*	10th	12	24	0	0	24	
				24	0	0	24.	24
„	*May*	3d	34	55	4	9	68	
	„	6th	50	80	4	14	98	
	„	11th	2	0	4	4	8	
	„	18th	89	113	167	0	280	
	„	19th	3	3	6	0	9	
	„	24th	45	65	6	0	71	
				316	191	27	534	534
„	*June*	1st	27	91	9	24	124	
	„	3d	9	0	0	20	20	
	„	10th	21	22	8	7	37	
	„	13th	15	0	31	44	75	
	„	20th	63	83	17	0	100	
	„	21st	47	70	0	13	83	
	„	23d	12	15	0	0	15	
	„	26th	2	0	36	0	36	
	„	27th	67	112	14	5	121	
	„	30th	108	77	747	12	836	
				470	862	125	1,457	1,457
„	*July*	3d	8	1	15	7	23	
	„	4th	10	5	0	9	14	
	„	5th	17	0	6	20	26	
	„	6th	30	26	7	18	51	
	„	8th	1	0	18	0	18	
	„	10th	67	66	6	24	96	
	„	13th	131	187	33	0	220	
	„	14th	6	6	0	0	6	
	„	17th	23	6	2	25	33	
	Carried over,.....			297	87	103	487	5,480

Year.	Month.	Date.	Number of kinds of Plants.	Number of Ornamental Plants.	Number of Useful Plants.	Number of Fruit Trees.	Total Number of Plants.	Grand Total.
	Brought forward			297	87	103	487	5,480
1843,	*July*	18th	15	2	67	21	90	
	„	19th	103	429	19	0	448	
	„	21st	16	11	3	20	34	
	„	22d	5	3	0	14	17	
	„	24th	66	86	16	3	105	
	„	26th	28	16	10	16	42	
	„	27th	70	90	22	4	116	
	„	28th	80	221	7	16	244	
	„	29th	147	144	24	25	193	
				1,299	225	222	1,776	1,776
„	*August*	1st	160	177	25	74	276	
	„	2d	23	19	1	18	38	
	„	3d	225	522	49	0	571	
	„	4th	162	218	26	1	245	
	„	5th	93	108	10	30	148	
	„	7th	67	52	16	21	89	
	„	9th	149	98	45	87	230	
	„	11th	163	139	3	33	175	
	„	14th	39	39	72	14	125	
	„	15th	20	26	6	0	32	
	„	16th	19	27	0	0	27	
	„	18th	20	22	2	0	24	
	„	19th	81	140	62	0	202	
	„	21st	11	3	2	20	25	
	„	22d	24	0	7	28	35	
	„	23d	73	178	519	43	740	
	„	25th	82	70	5	39	114	
	„	26th	3	2	0	2	4	
	„	29th	135	820	4	0	824	
	„	30th	76	63	8	25	96	
				2,723	862	435	4,020	4,020
„	*September*	1st	33	29	15	12	56	
	„	2d	45	60	0	2	62	
	„	4th	77	73	3	9	85	
	„	6th	7	0	1	12	13	
	„	8th	36	34	15	16	65	
	„	11th	78	152	8	8	168	
	Carried over			348	42	59	449	11,276

Year.	Month.	Date.	Number of kinds of Plants.	Number of Ornamental Plants.	Number of Useful Plants.	Number of Fruit Trees.	Total Number of Plants.	Grand Total.
	Brought forward			348	42	59	449	11,276
1843,	*September*	12th	70	71	51	16	138	
	„	13th	128	446	2,011	33	2,490	
	„	14th	198	742	54	4	800	
	„	16th	23	46	5	0	51	
	„	20th	114	149	17	32	198	
	„	21st	5	0	0	8	8	
	„	22d	31	76	0	0	76	
	„	23d	1	4	0	0	4	
	„	25th	18	27	0	2	29	
	„	26th	22	0	34	14	48	
	„	28th	19	0	0	36	36	
	„	29th	74	209	1	0	210	
				2,118	2,215	204	4,537	4,537
	October	4th	1	0	36	0	36	
	„	6th	140	182	109	12	303	
	„	9th	26	22	12	38	72	
	„	10th	2	3	0	0	3	
	„	11th	42	62	4	0	66	
	„	12th	236	774	98	0	872	
	„	14th	87	131	16	19	166	
	„	15th	54	100	0	0	100	
	„	16th	9	9	9	0	18	
	„	17th	35	43	0	2	45	
	„	18th	17	0	3	32	35	
	„	20th	10	10	0	0	10	
	„	21st	2	0	1,600	4	1,604	
	„	23d	37	81	0	0	81	
	„	27th	71	89	26	18	133	
	„	28th	50	82	0	0	82	
	„	30th	161	506	28	20	554	
				2,094	1,941	145	4,180	4,180
	November	4th	20	18	4	9	31	
	„	7th	4	0	0	8	8	
	„	10th	91	151	3	11	165	
	„	11th	75	162	3	0	165	
	„	13th	61	85	6	42	133	
	„	14th	128	269	38	95	402	
	Carried over			685	54	165	904	904

Year.	Month.	Date.	Number of kinds of Plants.	Number of Ornamental Plants.	Number of Useful Plants.	Number of Fruit Trees.	Total Number of Plants.	Grand Total.
	Brought forward			685	54	165	904	
1843,	*November*	16th	16	14	1	9	24	
	„	18th	83	323	19	10	352	
	„	20th	19	67	3	23	93	
	„	21st	22	30	2	0	32	
	„	22d	58	55	15	22	92	
	„	24th	116	118	38	74	230	
	„	25th	237	794	78	0	872	
	„	27th	78	152	29	0	181	
	„	28th	26	34	8	4	46	
	„	29th	83	120	121	21	262	
				2,392	368	328	3,088	3,088
	December	1st	62	62	16	34	112	
	„	4th	57	51	3	10	64	
	„	5th	8	0	0	27	27	
	„	6th	38	63	1	0	64	
	„	8th	88	119	3	14	136	
	„	11th	45	68	0	0	68	
	„	12th	24	34	4	0	38	
	„	13th	38	41	11	18	70	
	„	15th	95	250	74	70	394	
	„	18th	50	77	1	8	86	
	„	19th	14	8	2	7	17	
	„	20th	104	150	3	40	193	
	„	21st	28	32	2	0	34	
	„	22d	14	0	3	18	21	
	„	27th	34	39	1	0	40	
	„	29th	95	91	7	3	101	
	„	30th	1	1	0	0	1	
Average number of kinds of Plants, ...			1,900	1,086	131	249	1,466	1,466
								24,547
				Add Plants despatched in closed or open cases, ...				2,737
								27,284
Ditto ditto ditto 1836—1840, ...			1,700					
Average of yearly issues from the 2nd January 1836 to the 30th November 1840, including Plants despatched in closed or open cases, ...								25,186

C.

List of Plants in boxes distributed from the Hon'ble Company's Botanic Garden from 1*st January to* 31*st December*, 1843.

	Number of Boxes.	Number of kinds of Plants.	Number of Ornamental Plants.	Number of Useful Plants.	Number of Fruit Trees.	Total.
Assam,	4	59	62	25	17	104
Botanic Garden Ceylon,	2	2	0	0	21	21
Ditto ditto Seharunpore,	4	94	123	21	8	152
Bourbon,	3	42	35	134	0	169
Commissioner of Arracan,	8	108	157	84	0	241
Egypt,	1	13	10	15	0	25
England,	39	709	747	77	40	864
France,	8	157	150	40	27	217
Mauritius,	8	138	125	181	13	319
Mr. Knight, Chelsea,	2	25	24	12	0	36
Messrs. Loddiges & Sons, Hackney,	2	26	23	14	0	37
Royal Botanic Garden, Kew,	4	55	60	10	0	70
Straits of Malacca,	17	251	247	12	124	383
Swan River,	2	30	0	9	41	50
Sydney,	1	20	16	0	8	24
Upper Provinces,	1	24	24	1	0	25
	102		1,803	635	299	2,737
Average of five years during Dr. Wallich's Superintendance,	135					

D.

List of Seeds distributed in packets from the Hon'ble Company's Botanic Garden from 1*st January to* 31*st December*, 1843.

Year.		Number of Packets.	Number of kinds of Seeds.	Number of Ornamental ditto.	Number of useful ditto.	Vegetable Seeds.	Sissoo Seeds.	Tobacco Seeds.	Coffee Seeds.	Hyoscyamus ditto.
1843.										
	Almorah,	2	60	60	0	0	0	0	0	0
	Botanic Garden Bombay,	1	94	92	2	0	0	0	0	0
	Ditto ditto Peradenia,	1	0	0	0	0	0	0	0	1
	Ditto ditto Seharunpore,	5	60	58	2	0	0	0	0	0
	Calcutta,	12	50	50	0	0	0	0	0	0
	Cape of Good Hope,	3	115	114	1	0	0	0	0	0
	Ceylon,	2	0	0	0	0	0	2	0	0
	Colonial Secretary Colombo,	7	0	0	0	0	7	0	0	0
	Commissioner of Arracan,	3	20	19	1	0	0	0	0	0
	Ditto of Assam,	5	72	71	1	0	0	0	0	0
	Copenhagen,	1	113	112	1	0	0	0	0	0
	Deyrah Dhoon,	5	0	0	0	0	0	0	5	0
	England,	78	122	117	5	0	0	0	0	0
	India House,	8	30	30	0	0	0	0	0	0
	Ditto ditto,	8	34	34	0	8	0	0	0	0
	Madras,	3	77	76	1	0	0	0	0	0
	Singapore,	3	122	118	4	0	0	0	0	0
	Various parts of India,	63	115	114	1	0	0	0	0	0
		210	1,084	1,065	19	8	7	2	5	1

E.

List of useful Plants in the Hon'ble Company's Botanic Garden.

1. Acacia Catechu.
Acorus Calamus.
Aegle Marmelos.
Aloe barbadensis.
5. Aquilaria Agallocha.
Areca Catechu.
Areng saccharifera.
Balsamodendrum Commiphora.
10. Bambusa gigantea.
Bassia butyracea.
—— latifolia.
—— longifolia.
Batatas paniculata.
15. Berrya Ammonilla.
Bixa Orellana.
Brosimum Alicastrum.
Broussonetia papyrifera.
Butea frondosa.
20. Camphora officinarum.
Canella alba.
Capsicum purpureum.
Carissa Carandas.
Cassia Fistula.
25. Casuarina equisetifolia.
Cedrela Toona.
Cerbera Tanghin.
Cæsalpinia Coriaria.
———— Sappan.
30. Chloranthus erectus.
Chloroxylon Swietenia.
Cicca disticha.
Cocos nucifera.
Coffea arabica.
35. Crinum asiaticum.
Croton Tiglium.
Curcuma Amada.
Cycas circinalis.
—— revoluta.
40. —— sphærica.
Dalbergia Sissoo.
Dillenia speciosa.
Diospyros Embryopteris.
Dipterocarpus alatus.
45. Dorstenia Contrajerva.
Elaeocarpus serratus.
Elaeodendron glaucum.
Emblica officinalis.
50. Equisetum debile.
Eugenia Pimenta.
Feronia Elephantum.
Flacourtia sapida.
Gossypium religiosum.
55. Guajacum officinale.
Hæmatoxylon campechianum.
Hemidesmus indicus.
Hibiscus surattensis.
Hopea odorata.
60. Hypoestes purpurea.
Janipha Manihot.
Kæmpferia Galanga.
Lagerstroemia Reginæ.
Maclura tinctoria.
65. Manettia cordifolia.
Mangifera oppositifolia.
Maranta arundinacca.
Marsdenia tinctoria.
Melaleuca Cajeputi.
70. Melanorrhoea usitata.
Mentha viridis.
Morus alba.
—— indica.
Musa textilis.
75. Opuntia coccinellifera.
Phænix sylvestris.
Pinus longifolia.
Piper nigrum.
Poupartia dulcis.
80. Prinsepia utilis.
Puchapaut.
Quassia amara.
Quisqualis indica.
Rhus Vernix.
85. Ricinus communis.
Rosmarinus officinalis.

Rottlera tinctoria.
Saccharum officinarum.
Sanseviera zeylanica.
90. Santalum album.
Shorea robusta.
Soymida febrifuga.
Strychnos Nux vomica.
——— potatorum.
95. Swietenia Mahagoni.
Tectona grandis.
Terminalia Catappa.
Terminalia Orjuna.
Thea Bohea.
100. —— viridis.
Theobroma Cacao.
Thymus vulgaris.
Vanilla aromatica.
Wrightia tinctoria.
105. Xanthochymus pictorius.
Zalacca edulis.
107. Zizyphus Jujuba.

F.

List of Additions to distribution list since 1841.

Abutilon striatum.
Acacia arabica.
——— caesia.
Acanthus madraspatensis.
Actinophora fragrans.
Adenanthera falcata.
Allium tuberosum.
Alströmeria pulchra.
Alyxia stellata.
Amoora Rohitoka.
Amphilobium Mutisii.
Angelonia salicariæfolia.
Ardisia pedunculosa.
Aristolochia anguicida.
——————— brasiliensis.
——————— fœtens.
Artemisia lactiflora.
Arum trilobatum.
Arundo Donax, var. versicolor.
Asclepias paniculata.
Atalantia pubigera.

Banisteria laurifolia.
Bauhinia Richardiana.
Beilschmidtia Roxburghiana.
Bignonia echinata.
——————— equinoctialis.
——————— gracilis.
Boerhaavia repanda.
Buginvillea spectabilis.
Buxus sempervirens.

Cacalia coccinea.
——— cylindrica.
——— nepalensis.
——— purpurascens.
Caesalpinia digyna.
——————— paniculata.
——————— tortuosa.
Colquhounia coccinea.
Canna pulchra.
——— flavescens.
Canavalia incana.
Caprifolium Periclymenum.
Carex muricata.
Carissa diffusa.
Cassia australis.
——— bacillaris.
——— hirsuta.
——— marylandica.
——— occidentalis.
——— Tora.
——— torosa.
——— Wightiana.
Catalpa syringæfolia.
Castanea indica.
Celastrus fascicularis.
Cerbera parviflora.
Ceratogonum atriplicifolium.
Ceratonia Siliqua.
Cereus Myosurus.
Cestrum laurifolium.
Clausena punctata.
Clematis Cadmia.
Clerodendron pyramidale.
Coccoloba excorticata.
Cocculus Nephroia.
Coffea tetrandra.
Colubrina asiatica.
Combretum extensum.
Commelina Ionosma.
Cordia serrata.
——— tectonæfolia.
Cornus oblonga.
Cratæva obovata.
Crotalaria capensis.
——————— cuspidulata.
——————— laburnifolia.
——————— latifolia.
——————— retusa.
Crotón lepidotum.
Cryptocarya floribunda.
Cupressus fastigiatus.
——————— orientalis.

Curcuma attenuata.
——— Zedoaria.
Cymaria elongata.

Dalbergia crassifolia.
——— marginata.
Daphnidium bifarium.
Deutzia scabrella.
Desmodium ancistrocarpum.
——— paniculatum.
Dipteracanthus turbinatus.
Dracæna cernua.
——— Helferiana.
——— stricta.
Duranta Ellisii.

Eugenia bracteata.
Epiphyllum alatum.
Eupatorium repandum.
Euphorbia hoyæfolia.
Eustrephus angustifolius.

Ficus mangifolia.
Flacourtia ferox.
——— Stigmarota.
Flemingia nana.
Franciscea uniflora.

Garcinia cornea.
——— Gambogia.
Garuga pinnata.
Gaudichaudia guaranitica.
Gendarussa furcata.
Ginoria nepalensis.
Gomphostemma melissœfolium.
Grewia columnaris.
——— sepiaria.
Gynura bicolor.

Hamelia patens.
Hedera floribunda.
Heritiera littoralis.
Heteropteris argentea.
Hibiscus cannabinus.
——— Patersonii.
——— phœniceus.
——— populneus.
Hibiscus tortuosus.
Helicteres spectabilis.
Holostemma Rheedei.
Hopea eglandulosa.
Hovenia dulcis.
Hydrangea mutabilis.
Hyptis radiata.

Indigofera tinctoria.
Inocarpus edulis.
Ipomæa grandiflora.
——— obscura.
——— Pes tigridis.
——— plicata.
——— polyantha.
——— Quamoclit.
——— rubens.
——— sidæfolia.
——— sinuata.
——— Staphylina.
——— tuberosa.
——— vitifolia.
——— Wightii.
Ixora cuneifolia.
——— longiflora.

Jasminum fruticans.
——— pubescens.
Juniperus cernua.
Jussieua villosa.
Justicia flavicoma.

Kadsura japonica.

Lagunæa Patersonii.
Lantana aculeata.
——— canescens.
——— Selloviana.
Laurus Cassia.
——— nobilis.
Lecontea Bojerana.
Leucas styligera.
Ligustrum nepalense.
Lilium longifolium.
Limonia alternans.
Linaria ramosissima.
Linociera macrophylla.

Lomaria scandens.
Lonicera confusa.

Malpighia glabra.
Malvaviscus arboreus.
Mangifera sylvatica.
Mappa Roxburghiana.
Melissa officinalis.
——— repens.
Mentha arvensis.
Mimosa asperata.
——— pudica.
Modecca furfuracea.
Momordica mixta.
Monarda fistulosa.
Morus multicaulis.
——— tinctoria.
Mussænda frondosa.

Nauclea undulata.
Negundo fraxinifolium.
Nelsonia lamiifolia.
Nepeta ciliaris.

Ocymum micranthum.
Oenothera rosea.
Olea capensis.
—— europea.
—— myrtifolia.
Ophioglossum cordifolium.
Orthosiphon stamineus.
Orthostemma lineatum.
———— roseum.

Panax digitatum.
Pandanus utilis.
Paratropia nudiflora.
Passiflora alata.
———— holosericea.
———— kermesina.
———— quadrangularis.
Pavetta tomentosa.
Pereskia grandiflora.
Petunia nyctaginiflora.
Pheomeria magnifica.
Philadelphus coronarius.
Phlomis lucida.
Phyllanthus baeobotryoides.
———— tetrandra.
———— Vitis idæa.
Piper nereifolium.
——— pereskiæfolium.
Pitcairnia integrifolia.
Platanthera Susannæ.
Pluchea indica.
Plumbago capensis.
———— rosea.
———— zeylanica.
Polygonum adenotrichum.
———— macrophyllum.
———— repens.
Pongamia multijuga.
Poupartia borbonica.
———— axillaris.
Premna esculenta.
Psidium polycarpum.
Psyadia dentata.
Pyrethrum indicum.

Quercus assamica.

Randia acuminata.
——— longispina.
Rhus lucida.
Riedleia guazumæfolia.
Rivina lævis.
Rosa longispina.
—— multiflora.
Ruellia dependens.
——— linifolia.

Saccostemma urticæfolium.
Sambucus rubra.
Sapium cordifolium.
Schotia speciosa.
Scytalia variabilis.
Sida mollis.
—— rombifolia.
Siphonanthus hastatus.
Siphonodon celastrineus.
Solanum Balbisii.
Spondias lutea.
Stachys lanata.
Stellaria trandra.

Stemodia polyantha.
Sterculea heterophylla.

Tænacium pinnatum.
Tephrosia urophylla.
Terminalia citrina.
Tetradenia umbrosa.
Thibaudia variegata.
Trophis aspera.

Unona penduliflora.
Uraria campanulata.
Urtica crenulata.
Urtica alienata.

—— smilacifolia.
Uvaria bicolor.

Verbena Aubletia.
Vitis glaberrima.

Willughbeia edulis.

Zanonia angulosa.
Zizyphus incurva.

Total 274.

G.

List of Plants introduced into the Hon'ble Company's Botanic Gardens, 1843.

1. Abrus melanospermus.
Acacia lophantha.
——— Sp.
Achillea millefolium.
Achimenes longiflora.
——— rosea.
Agave fœtida.
Alströmeria parviflora.
——— peregrina.
10. Aporum acinaciforme.
——— Jenkinsii.
——— micranthum.
Appendicula callosa.
——— Lewisii.
Araucaria brasiliensis.
15. ——— imbricata.
Areca horrida.
——— Sp.
Arenga Westerhoutii.
20. Aristolochia acuminata.
Avicennia tomentosa.
Bactris setosa.
Barleria brasiliana.
Begonia discolor.
25. ——— manicata?
——— pauciflora.
Bignonia Freemanniana.
Bolbophyllum, Sp.
Brownlowia Rhizophorearum.
30. Brownia grandiceps.
Bulbine rostrata.
Butea suffruticosa.
Calamus Jenkinsianus.
35. ——— longisetus.
Camellia Japonica—3 var.
Campanula, Sp.
Carludovica angustifolia.
40. Cedrela serrata.
Cerasus Jenkinsii.
Ceratopteris thalictroides.
Cereus albispinus.
45. ——— Andersoni.
——— brasiliensis.
——— cærulescens.
——— gladiatus.
——— Grantii.
50. ——— heptagonus.
——— nycticalus.
——— rigidispinus.
——— strigosus.
——— tortuosus.
55. Chamaerops Ritchiana.
Chenopodium maritimum.
Citrus angulata.
Clavija ornata.
Clerodendrum splendens.
60. Coccoloba rugata.
Cocos brasiliensis.
——— Clappa Whangie.
——— Logye.
——— plumosa.
65. Columnea Schiediana.
Coronilla glauca.
Cycas malaccensis.
——— pectinata.
Cynanchum, Sp.
70. Davallia, Sp.
Desmoncus polyacanthus.
Dianthus latifolius.
Didymoplexis pallens.
Diodemata glomerata.
75. ——— microdassa.
——— sulphurea.
Dipteracanthus, Sp.
Durio zibethinus.
Echinocactus Gayanus.

80. Echinocactus hystricanthus.
——— nobilis.
——— obvallatus.
——— obovatus.
——— oxygonus.
85. ——— pumilus.
——— recurvus.
——— strigosus.
——— subporrectus.
——— tortuosus.
90. Epiphyllum albidum.
——— Bawtryanum.
——— brasiliense.
——— Freesianum.
——— speciosum.
Equisetum, Sp.
95. Euproboscis pygmæa.
Eurycoma longifolia.
Fourcroya longœva.
Franciscea latifolia
——— Pohliana.
100. Fuchsia Devoniana.
Gaillardia picta.
Genista dalmatica.
Geodorum appendiculatum.
105. ——— attenuatum.
——— laxiflorum.
Gesneria zebrina.
Gloxinia calycina.
——— grandiflora.
110. ———, 2 Sp.
Gustavia augusta.
Hamelia chrysantha.
——— ventricosa.
Hedychium flavum.
115. Hibiscus buonariensis.
——— Harrisii.
——— spectabilis.
Hoya grandiflora.
—— longifolia.
120. Illicium anisatum.
Inga Harrisii.
Ipomœa velutina.
Ipoo of Naning.
Juglans, Sp.
125. Jussieua villosa.
Justicia carnea.
Justicia coccinea.
———superba.
———, Sp.
130. Kennedya monophylla.
——— rubicunda.
Lasiopetalum, Sp.
Lemonia spectabilis.
Livistona Jenkinsiana.
135. Lobelia gracilis.
Malpighia hypericifolia.
Mammillaria dicantha.
——— formosa.
——— tubispina.
140. ——— longimamma.
——— Maschalocantha.
——— Newmanniana.
——— quadrifida.
——— quadrispina.
145. ——— raphidicantha.
——— sericea.
——— setosa.
——— sphærotheca.
——— subulata.
150. ——— tricantha.
——— vivipara.
Morina odorata.
Natsiatum herpeticum.
Neesia triflora.
155. Nicotiana glauca.
Orontium, Sp.
Oxyanthus speciosus.
Pachycentria intermedia.
Passiflora fragrans.
160. ——— Middletoniana.
Petrea Stapelia.
Petunia nyctaginiflora.
Phytocrene, 2 Sp.
Pinus macrocarpa.
165. Pladera pusilla.
Plantago lanceolata.
Pæderia recurva.
Polanisia Chelidonii.
Pothos, 2 Sp.
170. Psidium, Sp.
Quercus macrophylla.
———, Sp.
Rondeletia speciosa.

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Rosa, several varieties.
Rubia cordifolia.
175. Rubus Gowrie phul.
Sabal Blackburnianum.
Sinningia Halleri.
Solanum havanense.
180. ——— trilobatum.
Symphorema polyandrum.
Tecoma stans.
Triphasia americana.
Vanilla Pompona.
185. Verbena triphylla.
Wallichia oblongifolia.
24 Cacteæ, unnamed.
5 Aroideæ, ditto.
21 Unnamed from Bourbon.

Total 238

II.

List of Plants lost in the Hon'ble Company's Botanic Gardens in 1843.

1. Acanthus madraspatensis.
Acacia Careyana.
Achras sessiliflora.
Acriopsis javanica.
5. Acropera, Sp.
Adhatoda corynostachya.
Ageratum conyzoides.
Ajuga bracteosa.
Allium spirale.
10. Ancistrolobus eugenifolia.
Anoda hastata.
Aphanochylus blandus.
Appendicula Lewisii.
Ardisia hymenandra.
15. —— pubigera.
Aristolochia saccata.
Arum apertum.
—— sessiliflorum.
—— viviparum.
20. Asphodelus fistulosus.
Azara integrifolia.
Begonia nitida.
Barleria buxifolia.
Batatas albo-hirsuta.
25. Bauhinia corymbosa.
Calla picta.
—— virosa.
Centaurea bracteata.
———— splendens.
30. Cercis Siliquastrum.
Chazalia borbonica.
Cichorium Intybus.
Cissus capensis.
Clematis cylindrica.
35. Conyza balsamifera.
———— chinensis.
Cordia Gerascanthus.
Cornus oblonga.
Crescentia alata.
40. Crotalaria cuspidulata.
———— incana.
———— vasculosa.
———— uncinella.
Curculigo recurvata.
45. Curcuma cordata.
———— grandiflora.
———— parviflora.
Cynoglossum Falconerianum.
Dendrobium æmulum.
50. Dæmia extensa.
Desmochæta velutina.
Dolichos ferreoloides.
———— mollissimus.
———— vexillatus.
55. Dysophylla verticillata.
Echites venenata.
Elæococcus verrucosus.
Elaeocarpus Ganitrus.
Epidendrum fragrans.
60. Eranthemum crenulatum.
Euphorbia punicea.
Fritillaria Thomsoniana.
Gomphostemma parviflorum.
Habenaria decora.
65. ———— Susannæ.
Hedera floribunda.
Hedychium gracile.
Hedysarum Alhaji.
Helianthus tuberosus.
70. Helonias bullata.
Hibiscus sulphureus.
———— surattensis.
Hæmanthus toxicarius.
Hoya Jenkinsii.
75. Hygrophila obovata.
Hypoxis ovata.
Ipomoea pileata.
———— rubens.
———— staminea.
80. ———— tridentata.
Itea macrophylla.
Jasminum approximatum.
———— caudatum.
Jossinia buxifolia.
85. Knoxia verticillata.
Luffa major.

Lycopsis arvensis.
Magnolia grandiflora.
Melaleuca nodosa.
90. Maurandia semperflorens.
Maxillaria pallidiflora.
Mentha auricularia.
——— fruticosa.
——— quadrifolia.
95. Morinda tinctoria.
Myrtus tomentosa.
Narcissus Jonquil.
Olax imbricata.
Œnothera odorata.
100. Ophioxylon majus.
Otochilus albus.
——— fusca.
Pancratium glaucum.
Paullinia carthaginensis.
105. Pharbitis hispida.
Phyllanthus patens.
Piper magnoliæfolium.
Pistacia Lentiscus.
Plantago attenuata.
110. Pothos acaulis.
——— cannifolia.
——— cordata.
——— Harrisii.
——— sagittifolia.
115. Prockia crucis.
Pueraria Wallichii.
Rondeletia odorata.
Saccolabium carinatum.
Sarcanthus affinis.
120. ——— pallidus.
Sauromatum guttatum.
Sida graveolens.
Solandra viridiflora.
Sophora japonica.
Spathoglottis violacea.
Stachys sericea.
Strychnos colubrina.
Syzygium oleinum.
Tacca aspera.
130. Tephrosia coccinea.
——— villosa.
Thrinax parviflora.
Tetradenia umbrosa.
Toxocarpus laurifolius.
135. Tradescantia fuscata.
Tylophora tenuissima.
Unona longiflora.
Uraria retrofracta.
Urtica smilacifolia.
140. Uvaria bracteata.
——— sesquipedalis.
Vanguiera macrophylla.
Veronica incana.
144. Viburnum polycarpum.
Webera coriacea.
Xanthorrhoea hastilis.
Zanonia integerrima.
148. Zephyranthus grandiflora.

I.

List of additions to the Library, Hon'ble Company's Botanic Gardens, from December 1842 *to June* 1844.

	Vols.
Agardh, Recensio Specierum Generis Pteridis,	1
Annales des Sciences Naturales,	13
Ditto Ditto from July to September 1843, part,	3
Bauer and Hooker, Genera Filicum,	1
Bieberstein, Flora Taurico-Caucasica,	3
Bojer, Description du Genre Labourdonneisia,	1
Bueke (H. W.), Index Generalis et specialis,	1
Catalogue des Rosiers, Camellias Plantes Bulbeuses,	1
Charlton, Discovery of the Tea Plant of Assam,	1
Decriptions of some Nondescript Insects from Assam, chiefly collected by Wm. Griffith, Esq. F. L. S., Madras Medical Service, by the Revd. Federick Wm. Hope, M. A., F. R. S. and L. S.,	1
Don, General system of Gardening and Botany,	4
Gaudichaud (C.), Recherches des Vegetaux,	1
General report of the late General Committee of Public Instruction for 1840-41 and 41-42,	1
Griffith W, Muscologia Itineris Assamici,	1
Ditto, Remarks on a few plants from Central India,	1
Hedwig, Theoria Generationis et Fructificationis Plantarum Cryptogamicarum,	1
Hooker, Muscologia Exotica,	2
Holtzapfel, Descriptive Catalogue of the woods commonly employed in this country for the mechanical and ornamental Arts,	1
Journal des Champs, d' Agriculture, de Botanique, de Literature, de La Girdon for June and July 1843, Nos. 244 and 245,	2
Kaulfuss, Enumeratio Filicum,	1
Meyer and Bunge, Flora Altaica,	4
Murray, Encyclopædia of Geography,	3
Reports of the Council and Auditors of Zoological Society of London for the year 1842,	1
Ditto of the Royal Bot. Garden Peradenia near Kandy, from February to June 1843, by W. C. Ondaatje,	1
Repton, Landscape Gardening,	1
Rules and Regulations of the Medical College of Calcutta, 1843,	1
Rushton, Bengal and Agra Annual Guide and Gazetteer for 1841,	2
Saint Hilaire, Flora Brasiliæ Meridionalis,	2
Ditto, Nos. 21 to 24 inclusive, Parts	4
Steudel, Nomenclator Botanicus, 2edn.	1
Thompson George, Lectures on British India,	1
Walper, Repertorium Botanices Systematicæ,	1
Ditto Ditto, vol. 2. Nos. 1 to 4 inclusive, Parts	4
Total...	67

K.

List of Plants drawn from December 1842 *to June* 1844.

1. Acanthacea.
Areca, ... 3
Arenga Lewisii.
Aristolochia palmata.
Asiphonia piperiformis.
Balanophora affinis.
——— burmannica.
——— favina.
——— picta.
——— polyandra.
Bentinckia.
Calamosagus.
Calamus acanthospathus.
——— angustifolius.
——— arborescens.
——— calicarpus.
——— castaneus.
——— collinus.
——— Draco.
——— fasciculatus.
——— floribundus.
——— geminiflorus.
——— grandis.
——— hygrophilus.
——— Hystrix.
——— intermedius.
——— leptopus.
——— leptospadix.
——— Lewisianus.
——— longipes.
——— longisetus.
——— macrocarpus.
——— Mastersianus.
——— monticola.
——— nutantiflorus.
——— palustris.
——— ramosissimus.
——— Royleanus.
Calamus schizospathus.
——— tenuis.
——— verticillaris.
Caryota obtusa.
Chamœrops khasiyana.
Cissus (Embamma) caudiger.
Cyrthandraceæ, ... 12
Ericineæ, ... 7
Eugeissona triste.
Harina nana.
——— oblongifolia.
Ipoo of Rumbiya.
Lemonia spectabilis.
Licuala acutifida.
——— glabra.
——— longipes.
——— paludosa.
——— peltata.
——— triphylla.
Livistona assamica.
Macrocladus sylvicola.
Monotropa.
Primula, ...
Phœnix acaulis.
——— paludosa.
——— sylvestris.
Plectocomia elongata.
——— himalayana.
——— khasiyana.
Raphia.
Rotang kirtong.
Sagus Konigi.
Sapria himalayana.
Sarcocordalis areolata.
Schoepfia penduliflora.
Siphonodon celastrineus.
Thismia Brunonis.
Thottea grandiflora.

Tœnacium pinnatum.
Vaccinieæ, ... 15
Volkameria.
Zalacca edulis var. koombar.
——— affinis.
——— conferta.
——— glabrescens.
——— macrostachya.
Zalacca secunda.
Total,..... 119

With the exception of about 15, these are pencil drawings: as it was not considered advisable to have them coloured from memory.

L.

List of Genera and Species, proposed or elucidated from December 1842 *to June* 1844.

Agrostophyllum khasiyanum.
Aporum micranthum.
Appendicula Lewisii.
Bonatea benghalensis.
Calamosagus laciniosus.
„ wallichiæfolius.
Calamus acanthospathus.
„ angustifolius.
„ arborescens.
„ calicarpus.
„ castaneus.
„ collinus.
„ floribundus.
„ geniculatus.
„ grandis.
„ Hystrix.
„ insignis.
„ intermedius.
„ Jenkinsianus.
„ leptospadix.
„ Lewisianus.
„ longipes.
„ longisetus.
„ Mastersianus.
„ mishmeensis.
„ monticola.
„ nutantiflorus.
„ verticillaris.
„ palustris.
„ petiolaris.
„ ramosissimus.
Calamus Roxburghii.
„ Royleanus.
„ schizospathus.
Cansiera zyziphifolia.
Champereia.
Didymoplexis pallens.
Durio oxyleyanus.
Enkleia malaccensis.
Eugeissona triste.
Excœcaria oppositifolia.
Givotia rottleriformis.
Habenaria hamigera.
„ tenuis.
Jenkinsia assamica.
Leptonium oblongifolium.
Myriopteron paniculatum.
Plagiopteron suaveolens.
Plectocomia assamica.
„ himalayana.
„ khasiyana.
Roxburghia viridiflora.
Sagus Konigi.
Siphonodon celastrineus.
Zalacca affinis.
„ conferta.
„ glabrescens.
„ macrostachya.
„ secunda.

Total..... 59

WILLIAM GRIFFITH,
Offg. Superintendent.

Hon'ble Company's Botanic Garden,
21*st June*, 1844.

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